

INSTALLING WINDOWS 2000 PROFESSIONAL

**After reading this chapter and completing the exercises,
you will be able to:**

- ◆ Decide whether to perform an upgrade or a fresh installation of Windows 2000 Professional
- ◆ Boot multiple operating systems
- ◆ Plan an installation or upgrade
- ◆ Perform an unattended installation
- ◆ Install Windows 2000 using disks, the CD-ROM, or the network
- ◆ Describe the various Setup and advanced installation options

There are a number of issues that must be considered when installing any operating system, and Windows 2000 Professional is no exception. This chapter details the various steps that must be taken to get Windows 2000 up and running. It also examines such issues as whether to perform a fresh installation or to upgrade from an earlier version. It covers the various methods used to install Windows 2000 (floppies, CD-ROM, or network-based), as well as a few things to watch out for along the way.

Although the interfaces are similar, Windows 2000 has more capabilities and more features than Windows 98, Windows 95, and even Windows NT 4.0, and also has greater hardware requirements. Before installing Windows 2000 Professional, you must first ensure that your computer meets the minimum requirements (and, preferably, the recommended requirements), as detailed in Chapter 1, and that all hardware to be used with Windows 2000 is listed on the hardware compatibility list (HCL).

UPGRADING VERSUS INSTALLING

When installing Windows 2000 Professional, you have a choice between upgrading an existing installation or performing a completely fresh installation. Upgrading is an option when you have a version of Windows 95/98, or Windows NT 4.0 Workstation or Server already installed, and want to preserve some of the settings and information from the previous installation, including password files, desktop settings, and general configuration. A fresh installation installs a completely new version of Windows 2000 Professional, without regard to any existing files on the system.

Windows 2000 Professional can be installed as a dual-boot OS with an existing installation of:

- Windows 95 (all releases)
- Windows 98 (all releases)
- Windows NT 3.51 Workstation (including service packs)
- Windows NT 4.0 Workstation (including service packs)

Typically, an upgrade installation is selected when you want to retain your existing desktop and network configuration. If you are having problems with your existing operating system and the environmental settings are not that important, a fresh installation may be a better option. A fresh or complete installation can be performed on a system with a blank hard drive, over an existing operating system, or in such a way as to create a **multiboot system** (that is, a system that can boot multiple operating systems).

Upgrading to Windows 2000 from Windows NT or Windows 98 is fairly straightforward. The process attempts to retain as many of the existing configuration and software settings as possible. The only items that will not be retained are system utilities or drivers specific to the existing operating system that are updated or removed from Windows 2000. To upgrade, launch Winnt32 from the distribution CD, and when prompted select the “Upgrade to Windows 2000” option (see Figure 2-1). (Try Hands-on Project 2-6 to practice upgrading.)



Figure 2-1 Choosing the upgrade option

BOOTING MULTIPLE OPERATING SYSTEMS

It is possible to install more than one operating system (OS) on the same computer, allowing you to determine which OS will be used at boot time. Unless you deliberately overwrite or **format** the **partition** (a space set aside on a disk and assigned a drive letter, which can take up all or part of the space on a disk) where another operating system is located, installing Windows 2000 Professional will not affect the other operating system.

Windows 2000 can be **dual-booted** easily (that is, it does not require third-party utilities) with the following operating systems:

- DOS (and Windows 3.x and Windows for Workgroups 3.x because they exist “on top of” DOS)
- Windows 95 or Windows 98
- Windows NT Workstation and Server 3.50, 3.51, and 4.0
- OS/2

Other operating systems, such as Linux, can be dual-booted with Windows 2000. However, to do so, Windows 2000 requires third-party boot and partition managers such as Partition Magic from PowerQuest (<http://www.powerquest.com>) or System Commander from V Communications (<http://www.v-com.com>).



In most cases (when third-party boot and partition software is not used), if you want a dual-boot system, you should install Windows 2000 on a system with an existing OS, rather than installing Windows 2000 first and then the other OS.

Installing Windows 2000 second enables the setup routine of Windows 2000 to properly configure the boot loader automatically. The **boot loader** is the software that shows all operating systems currently available and permits the user to choose which one should be booted, through a menu. At boot time, you can choose the operating system you want to run, as shown in Figure 2-2. Note that if you are dual-booting with a non-Windows operating system, the other OS is listed as “Previous Operating System on C:”.

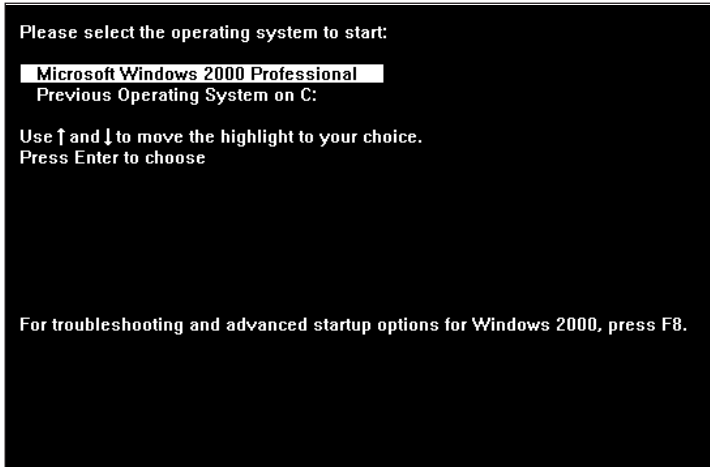
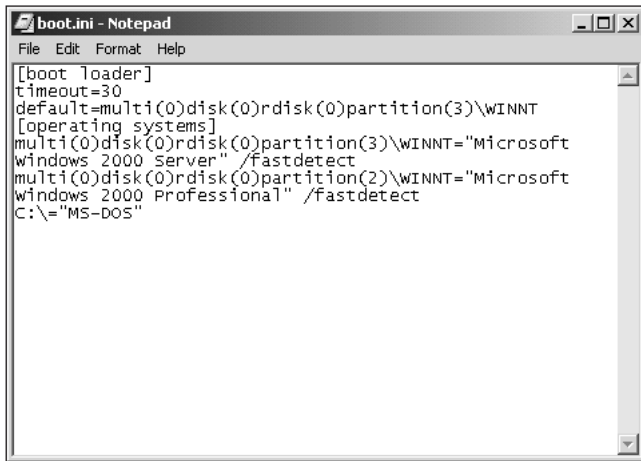


Figure 2-2 The Windows 2000 Professional boot menu



Just as in Windows NT, Boot.ini is a text file (see Figure 2-3) that creates the Windows 2000 boot loader's menu. To remove an operating system from the boot loader or edit its entry in the boot loader menu, you have to edit the file Boot.ini manually. Take note that by default, this file is read-only. In order to make changes to the file, you must first clear the read-only attribute (to do this, right-click the file in Windows Explorer, select Properties, and deselect the Read-only check box); otherwise, you won't be able to save your work. Plus, before you make changes, it's always a good idea to create a backup of the original (copy Boot.ini and rename it Boot.bak or something similar) just in case your changes cause an error.

If you plan to use more than one operating system, it's important to consider which **file system** to use and whether data must be accessible to more than one OS on the same machine. Windows 2000 may be installed on a FAT, FAT32, or NTFS partition (FAT, FAT32, and NTFS are covered in Chapters 1 and 4). Only NTFS supports the majority of the Windows 2000 file security features, but a partition formatted with NTFS will be invisible to other non-NT operating systems. If you want to share data between operating systems on the same computer, you must create a FAT or FAT32 volume for that purpose.



```
[boot loader]
timeout=30
default=multi(0)disk(0)rdisk(0)partition(3)\WINNT
[operating systems]
multi(0)disk(0)rdisk(0)partition(3)\WINNT="Microsoft
windows 2000 Server" /fastdetect
multi(0)disk(0)rdisk(0)partition(2)\WINNT="Microsoft
windows 2000 Professional" /fastdetect
C:\="MS-DOS"
```

Figure 2-3 A Boot.ini file showing a system set to dual-boot Windows 2000 Server and Professional

PLANNING THE INSTALLATION

Careful planning is essential to the smooth execution of any operating system. The importance of checking hardware against the HCL has already been discussed in Chapter 1, but that's only the beginning. It's also important to consider the following:

- The type of installation you want to perform, such as manual or unattended
- The partition on which the OS files will be stored and how that partition is to be formatted



Your computer system must meet Microsoft's minimum hardware requirements before you attempt an installation. Otherwise, you'll be unable to install the operating system properly and will waste a significant amount of time. To review the hardware requirements, refer to Chapter 1.



Windows 2000 Professional can be installed onto a multiprocessor system that hosts two CPUs. The installation routine will automatically configure the system to use multiple CPUs if they are present on the system. However, if you install Windows 2000 Professional with a single CPU and later add a second CPU, you must reinstall Windows 2000 or perform an upgrade installation when you add the second CPU. This is necessary to update the hardware-specific (motherboard, CPU, and so on) HAL (see Chapter 1) for multiprocessor support.

Types of Installations

For manual installations, you have a choice between a CD-ROM installation (covered in detail later in the chapter) and a network installation (covered in the next section). (Unattended installations are covered in a later section.) Installing from the CD is quite straightforward. If you have an existing OS, you may be able to avoid the **setup boot disks** (or floppies) that come with Windows 2000. A network installation requires a bit more preparation, as discussed in the next section.

Installing over the Network

To install Windows 2000 Professional over the network, you must have access to the Windows 2000 Professional distribution files via a network share (whether that share is a shared CD-ROM drive on a server or a copy of the files on a server's hard drive). The subdirectory containing the installation files varies depending on the architecture of the computer on which you're installing Windows 2000 Professional. For example, **x86**-based systems (386 and later CPUs, including the Pentium-based Intel chip architecture) require the files found in the \i386 folder on the Windows 2000 Professional CD-ROM. You'll want to set the general access permissions (that is, for the Domain Users group) on this shared folder to read-only. (Permissions are covered in Chapter 4, "Managing Windows 2000 File Systems and Storage.") Hands-on Project 2-1 gives step-by-step instructions for installing Windows 2000 Professional over the network.

Installing with or Without Floppy Disks

The Windows 2000 Professional installation CD-ROM comes with four setup boot disks, but these disks are necessary only if you're installing on a drive that is not presently bootable (that is, one that has not yet been formatted). If the setup boot floppies don't include drivers for your CD-ROM drive (this is sometimes the case with off-brand SCSI and IDE drives), you must perform a floppyless installation.

A floppyless installation requires that an existing operating system be present on the computer, or that bootable CD-ROMs are supported. This could be just DOS or anything more advanced. The existing OS must have access to the CD-ROM drive to launch the installation program. Plus, you'll need at least 650 MB of free hard drive space for the files that are copied during installation.

Creating Setup Boot Floppies

If the Windows 2000 setup boot floppies aren't available for some reason, you can create new ones. You'll need four blank floppy disks and a computer system running DOS or Windows. Execute Makeboot (16-bit OSs) or Makebt32 (32-bit OSs) in the \Bootdisk directory on the CD. This will launch the setup boot disk creation utility. Just follow the prompts and insert the blank floppies when instructed. The steps to create floppy setup disks are given in Hands-on Project 2-2.

Partitioning the Hard Disk

You may want to partition your hard disk before installing Windows 2000 Professional. Many people create a DOS boot partition that's accessible when booting from a floppy, so they can run diagnostic software and utilities that only run under DOS, but store data in an NTFS partition that is more secure and is inaccessible unless the system is booted to Windows 2000 or the other OS uses a third-party partitioning tool that supports NTFS partitions. Although it's possible to install Windows 2000 onto a FAT or FAT32 partition, neither version of FAT provides the advanced security features of NTFS, so you must determine which file system (or which combination of them) is more appropriate for your needs. Chapter 4 discusses in detail the capabilities and implications of the file systems supported by Windows 2000 and the criteria for choosing a file system. For now, it is sufficient to say that FAT/FAT32 partitions provide no security; so, if you require the assignment of rights to system resources, NTFS is the file system to use. There are other deciding factors as well, covered in detail in Chapter 4. Partition selection is covered in more detail under the "Text-only Portion of Setup" section of this chapter. Right now, it's important to know that the **active partition** is the partition that houses the Windows 2000 boot files. This is very important: if a computer doesn't know where to look for the boot files, it can't start. You can use the DOS **FDISK** utility to partition the hard disk before installation, or you can use the partitioning interface encountered during setup. Hands-on Project 2-3 walks you through the process of breaking a single large partition into two partitions.



The DOS FDISK utility can be used to create and delete partitions. However, it has limited capabilities with NTFS. FDISK can only recognize and delete primary NTFS partitions. FDISK cannot recognize or delete NTFS-formatted logical drives in an extended partition. (See the section entitled, "Destroying Partitions" to remove NTFS partitions.)

UNATTENDED INSTALLATIONS

It's possible to configure an **unattended installation** so that you don't have to respond to installation prompts, but instead provide a script containing the appropriate answers. Although it can take a little time and practice to set up an unattended installation, this type of installation can save time if you have to install Windows 2000 Professional on several machines. To run an unattended installation, run **Winnt** (DOS or Windows 3.x) with the /U and /S options from the command line (see the section "Winnt and Winnt32 Advanced Setup Options" later in the chapter) or **Winnt32** (Windows 95, 98, NT) with the /UNATTEND and /S options, to instruct Setup to perform an unattended installation using the files stored in the location you specify with the /S switch. To further customize an unattended installation, you can create an **answer file** in combination with a **uniqueness database file (UDF)**, which makes changes to an answer file that varies from one machine to another. The answer file is a text file that provides answers to installation prompts for unattended installations, the default sample of which is called Unattend.txt. The UDF, in conjunction with the answer file, allows you to create a unique answer set for each Windows 2000 Professional setup. For example, the UDF

might contain a username or workstation name that varies from installation to installation. To use the UDF in an unattended installation, specify /UDF:id on the Winnt or Winnt32 command line (the “:id” portion tells setup which UDF to use).

If you’re preparing an answer file for an unattended installation on an x86-based system, you’ll use the copy of Unattend.txt that’s found in the \i386 directory. If you must install several instances of Windows 2000 Professional that vary slightly (for example, the username differs), then you can use a UDF to supplement the answer file and override its parameters, as appropriate. The creation of answer files and UDFs is discussed shortly.

The Unattend.txt file included with Windows 2000 Professional contains default settings for a typical installation. Its contents are as follows:

```
; Microsoft Windows 2000 Professional, Server, Advanced
  Server and Datacenter Server
; (c) 1994 - 1999 Microsoft Corporation. All rights reserved.
;
; Sample Unattended Setup Answer File
;
; This file contains information about how to automate the
  installation
; or upgrade of Windows 2000 Professional and Windows 2000
  Server so the
; Setup program runs without requiring user input.
;

[Unattended]
Unattendmode = FullUnattended
OemPreinstall = NO
TargetPath = WINNT
Filesystem = LeaveAlone

[UserData]
FullName = "Your User Name"
OrgName = "Your Organization Name"
ComputerName = "COMPUTER_NAME"

[GuiUnattended]
; Sets the Timezone to the Pacific Northwest
; Sets the Admin Password to NULL
; Turn AutoLogon ON and login once
TimeZone = "004"
AdminPassword = *
AutoLogon = Yes
AutoLogonCount = 1

;For Server installs
[LicenseFilePrintData]
AutoMode = "PerServer"
```



```
AutoUsers = "5"

[GuiRunOnce]
; List the programs that you want to launch when the machine
; is logged into for the first time

[Display]
BitsPerPel = 8
XResolution = 800
YResolution = 600
VRefresh = 70

[Networking]
; When set to YES, setup will install default networking
; components. The components to be set are
; TCP/IP, File and Print Sharing, and the Client for Microsoft
; Networks.
InstallDefaultComponents = YES

[Identification]
JoinWorkgroup = Workgroup
```

This file can be modified either manually (with a text editor) or with the **Setup Manager**. The Windows 2000 Support Tools includes this wizard for creating or editing your own fully customized Unattend.txt files, along with complete details on how to edit this file and all of the possible syntax combinations. (Hands-on Project 2-4 shows you how to install the Support Tools, and Project 2-5 shows you how to create an answer file with the Setup Manager.) The Setup Manager Wizard is found in the \Program Files\Support Tools\ folder (if the defaults are used to install the Support Tools). Launching its executable file, Setupmgr.exe, will present you with the Windows 2000 Setup Manager Wizard. This wizard can be used to create a variety of installation scripts to perform the following functions:

- Duplicate the current system's configuration, edit an existing Unattend.txt file, or create a new file from scratch
- Create an installation script for Windows 2000 Professional, Server, and Advanced Server
- Run a script that is fully automated (no user interaction), read-only (user can view settings on each page but not make changes), and GUI (graphical user interface; text portion is automated), provide defaults (recommended settings are defined, but user can change during setup), or hide some configuration setup pages

Hands-on Projects 2-4 and 2-5 give examples of how to create an answer file using this wizard.

Creating the UDF

Multiple duplicate installations can be streamlined with the uniqueness database file (UDF). As mentioned, the UDF works in conjunction with the answer file, allowing you to override some settings in the answer file. Rather than having to create a new answer file for every

change to the installation, you can just specify a separate UDF. Most information will be covered in the answer file, but if a setting exists in both the specified UDF and the answer file, the UDF takes precedence.

You can create a UDF in a text editor such as EDIT or Notepad. This file provides unique answers for user ID, full name, computer name, time zone, and domain settings. It should look something like the following:

```
[UniqueIDs]
    UserID1 = Userdata,GuiUnattended,Network
    UserID2 = Userdata,GuiUnattended,Network

[UserID1:UserData]
FullName = "Horst Delbruck"
ComputerName = "Monster"

[UserID1:GuiUnattended]
TimeZone = " (GMT+01:00) Prague, Warsaw, Budapest)"

[UserID1:Network]
JoinDomain = "LabTechs"

[UserID2:UserData]
FullName = "Francis N. Stein"
ComputerName = "Doctor"

[UserID2:GuiUnattended]
TimeZone = "(GMT-06:00) Central Time (US & Canada)"

[UserID2:Network]
JoinDomain = "MadScientists"
```

When you've finished the UDF, save it as a text file and store it on disk. It's often helpful to name UDFs for the people using them, as they're likely to be customized for individuals.



A UDF can also be created using the Setup Manager Wizard from the Windows 2000 Support Tools. The Setup Manager Wizard is easy to use and offers lots of help. It walks you through every combination and option available to you in the setup procedure. More information about UDFs and details about the Setup Manager Wizard can be found in the Windows 2000 Support Tools.

USING THE SYSDIFF UTILITY

If you have a customized Windows 2000 Professional installation that you'd like to copy to other machines on your network, you can use the **Sysdiff** tool (available in the Windows 2000 Support Tools) to record the differences between a basic Windows 2000 Professional installation and the one you've altered.

To use Sysdiff to customize an installation, follow these steps:

1. If you haven't already done so, install Windows 2000 Professional. (See the section titled "Windows 2000 Professional Setup: Step by Step" later in this chapter for detailed instructions on how to do this.)
2. Type **SYSDIFF /SNAP <snapfile>** at a command prompt on that computer to create a snapshot of this installation in the filename you specify. (<*snapfile*> is the name of the snapshot file you wish to create.)
3. Install any software applications you'd like and make the system configuration changes you wish to record.
4. Type **SYSDIFF /DIFF *snapfile* <diffname>** on that computer to record the differences between the original installation and the new version in the file whose name you specify. (<*diffname*> is the name of the difference file you wish to create.)
5. Install Windows 2000 Professional on each of the destination computers.



The drive configuration and system root directory name must be identical to those of the original system.

6. Run **SYSDIFF /APPLY *diffname*** on each destination computer to add the files, naming the file created in /DIFF mode.

Those are the basic steps for performing a Sysdiff operation. (The switches that may be used with each of these commands are explained in detail in the Windows 2000 Support Tools.) You use Sysdiff in combination with an unattended installation. Table 2-1 shows what's actually happening when you use each of those commands.

Table 2-1 Sysdiff Switches

Mode	Function
Snap	When used with the Snap argument, Sysdiff takes a snapshot of the current Registry and the file system and directories. This information is recorded in a snapshot file.
Diff	The Diff argument records the differences between the view of the system as recorded with Diff and its state when Sysdiff is run again on the same system. The differences are recorded in a difference file.
Apply	Applies the data in the difference file to the Windows 2000 installation on which it's being run. Any differences in the operating system will be made, and any applications added to the installation.
Inf	Used to apply differences to installations across the network
Dump	Creates a text file listing the changes between the original installation and the amended one

ALTERNATE AUTOMATION OPTIONS

Microsoft has developed two other options for automating the installation of Windows 2000 Professional: the Remote Installation Services (RIS) and the System Preparation tool (Sysprep). RIS is a feature of Windows 2000 Server that can be employed to install any version of Windows 2000, including Professional. RIS takes advantage of DHCP to perform system installations over the network without requiring the installer to visit the destination system. RIS requires that DHCP, DNS, and the Active Directory be present and active on a domain. To employ RIS, you must follow these general steps:

1. Verify that all systems comply with hardware requirements.
2. Install Windows 2000 Server as a standalone/member server system. Install Remote Installation Services as an Optional Component during the installation or after initial installation is complete.
3. If DNS is not already present in the domain, install it.
4. Promote the Windows 2000 Server to a domain controller.
5. If DHCP is not already present in the domain, install it.
6. Initiate the configuration procedure for RIS by launching Risetup.exe from the Run command. Using the wizard, configure RIS for your requirements and network design.
7. Authorize RIS with the Active Directory via the DHCP Manager.
8. Use the Directory Management snap-in to further configure RIS and define remote installation parameters.

As you can see, employing RIS is not a simple task. The Windows 2000 Support Tools and several Technical Notes (specifically Remote Installation Walkthroughs) provide extensive details on using RIS to install Windows 2000 Server and Professional. You can access the Technical Notes through the TechNet CD or online at <http://www.microsoft.com/TechNet/?RLD=87>.

The **System Preparation tool (Sysprep.exe)** is used to prepare a system for disk imaging duplication. This tool allows Windows 2000 and installed applications to be quickly deployed on multiple computers with the exact same hardware components. Sysprep must be used with a third-party disk imaging product because it only prepares a system for duplication, it does not perform the duplication. Basically, Sysprep removes the configurable settings of a system which are defined in a typical Unattend.txt file and prepares the system to redetect all Plug and Play devices upon next reboot. Upon reboot of the source computer or any duplicated computers, a new security ID (SID; see Chapter 6) is created, a setup wizard is launched to prompt you for local system-specific data, such as computer name, product ID, and user name (the wizard can be managed through scripts to fully automate the process), and a full Plug and Play redetection of hardware occurs.

The basic process of using Sysprep is as follows:

1. Install Windows 2000.
2. Install any additional applications, services, or drivers.
3. Customize and configure the applications and services.
4. Run Sysprep to prepare the system for duplication. After Sysprep completes, it will shut down the system.
5. Use a disk imaging or duplication product to duplicate the disk.
6. Upon the next reboot of the original system or any duplicated drive, Windows 2000 will redetect Plug and Play devices and prompt you for any information not currently present in the system.

Sysprep can be used with a Sysprep.inf file, which contains the same information and uses the same structure and syntax as the Unattend.txt file created by the Setup Manager. Additional details on Sysprep can be found in the Windows 2000 Support Tools.



The Setup Manager Wizard from the Windows 2000 Support Tools includes the ability to create automated scripts for both Remote Installation Services and the System Preparation tool. These scripts can be easily employed to automatically install various versions of Windows 2000 onto a host or destination computer.

BEGINNING THE WINDOWS 2000 PROFESSIONAL INSTALLATION

Windows 2000 Professional offers numerous methods to launch, or start, the installation process. This section takes a look at them. You'll see that each has its own unique benefits and requirements.

CD-ROM Installation Launched from Setup Boot Floppies

The most common installation method is using the four setup boot disks to initiate the installation from a local CD-ROM drive. This is the preferred method if you must manually install storage drivers, when an existing OS is not present, or when network access is not available. To initiate this process, simply place the Windows 2000 Professional CD-ROM into an HCL-compliant CD-ROM drive, place the first of the setup boot floppies in the floppy drive, then reboot the system.

Bootable CD-ROM

The Windows 2000 Professional CD-ROM is self-booting. Thus, if your computer hardware supports this feature, you can bypass the four setup floppies by allowing the computer to boot from the CD-ROM. This method is a little faster than the floppy launch method. This method can be used regardless of the presence of an OS on the system or network access.



If your system does support bootable CD-ROMs, you'll need to remember to eject all bootable CDs before rebooting your system. This is especially true for the Windows 2000 CD itself. In most cases, to protect the security of the system, it is a good idea to disable bootable CD-ROMs via your CD-ROM controller's BIOS after you've installed Windows 2000.

CD-ROM Launch from Existing OS

The setup process can be launched from an existing OS or from a boot floppy that contains CD-ROM drivers. Launching the setup requires the execution of the Winnt (DOS or Windows 3.x) or Winnt32 (Windows 95, 98, NT) file from the \i386 directory. See the section later in this chapter on the Winnt and Winnt32 commands.

Network Installation

Performing a network installation simply means launching the setup routine from a network share instead of from a local device. This method requires an existing OS (or a boot floppy) and network access. The network share containing the Windows 2000 Professional distribution files can either be a shared CD-ROM drive on a server or a shared folder to which the files have been copied. In any case, a drive letter on the destination computer must be mapped to the shared drive or folder and then the Winnt or Winnt32 command launched. (See Hands-on Project 2-1.)



From DOS (and OSs installed over DOS), drive letters are mapped using the command-line syntax of "`net use x: \\servername\directory`" (where *x* is the drive letter to which you wish to map the shared network directory, *servername* is the name of the server on which the files are stored, and *directory* is the name of the installation directory). On Windows 95, 98, and NT, drive letters are mapped using the Tools, Map Network Drive command from Windows Explorer.

SETUP OPTIONS

Launching Setup using the various methods mentioned in the previous section can result in one of two setup initializations. If Setup is launched from the setup boot floppies, a bootable CD-ROM drive, or from DOS (including Windows 3.x and Windows for Workgroups 3.x) from either a local CD-ROM or a network share, Setup will launch in a text-only format initially and will later switch into a GUI format. If Setup is launched from Windows 95, 98, or NT from a local CD-ROM drive or from a network share, Setup will open a GUI setup wizard. To make discussion of these two setup initializations a little easier, the former is labeled the DOS setup method and the latter is labeled the Windows setup method.

The DOS setup method is discussed in detail a little later in this chapter. In fact, you will perform a complete, step-by-step walkthrough of this method. The Windows setup method employs an initialization setup wizard to preselect or predefine several setup options. The first

option is whether to perform an upgrade installation or to perform a clean installation. As mentioned earlier, an **upgrade installation** retains as much of the existing system as possible. A **clean installation** (also called a **fresh installation**) completely ignores all existing settings. If you select an upgrade installation, the wizard prompts you to read and agree to the license agreement, then it copies the required files to your hard drive before rebooting your system. Once rebooted, Setup runs through the text-only portion without prompting you, then continues into the GUI portion (covered later in this chapter).

If you decide to perform a clean installation, the wizard prompts you to read and agree to the license agreement, then prompts you to change setup options. The setup options are accessed via three buttons: Language Options, Advanced Options, and Accessibility Options. The Language Options button is used to change the base language. Accessibility Options enable the magnifier and narrator options. The Advanced Options button is used to set the following:

- Source path for installation files (default is `<cdrom_drive>:\i386`)
- Systemroot name (that is, where Windows 2000 will be installed—the default is `\Winnt`)
- Whether to copy all files from CD to a local directory before rebooting (the default is not to copy)
- Whether to allow selection of destination partition (the default is automatic selection)

Next, Setup prompts you to indicate whether you want to format the destination partition with NTFS. If you want to have a secure system, select NTFS. But, if data needs to be accessed from an operating system other than Windows NT (with Service Pack 5 applied) or 2000, select FAT. Finally, Setup copies the required files to your hard drive, then reboots the system. Once rebooted, Setup starts the text-only portion and continues in much the same manner as the DOS setup method. However, those prompts that have been predefined will be skipped.

Winnt and Winnt32 Advanced Setup Options

Earlier in this chapter were a number of references to Winnt and Winnt32 and some of the switches that may be used with each. You might be wondering, however, what the difference is between the two, why you'd use each, and what the complete set of switches is for each command. The function of these two command-line tools has changed from Windows NT. In Windows 2000, they each have a different purpose.

Winnt is the 16-bit setup tool designed to be launched from DOS and operating systems that rely upon DOS (such as Windows 3.x and Windows for Workgroups 3.x). Winnt is designed for standard and automated installations with few additional options. The command-line syntax for the Winnt command is as follows:



This material is taken from the online Help information on the installation CD in the `/i386` directory, obtained by entering the `"winnt /?"` command at the command prompt.

```
WINNT [/S[:sourcepath]] [/T[:tempdrive]] [/I[:inffile]] [/X]
[/C] [/U[:answer_file]] [/UDF:id[,UDF_file]] [/R[x]:folder]
[/E:command] [/A]
```

- /S[:sourcepath] -- Specifies the source location of the Windows 2000 files. The location must be a full path of the form x:\[path] or \\server\share\[path]. The default is the current folder.
- /T[:tempdrive] -- Directs Setup to place temporary files on the specified drive and to install Windows 2000 on that drive. If you do not specify a location, Setup attempts to locate a drive for you.
- /I[:inffile] -- Specifies the file name (no path) of the Setup information file. The default file name is Dosnet.inf.
- /X -- skips the creation of the Setup startup floppy disks. The Setup startup floppy disks that came with your Windows 2000 software are required after Setup restarts the computer.
- /C -- Skips the free disk space verification of the Setup startup floppy disks.
- /U[:answer_file] -- Performs unattended Setup using an answer file (requires /S). The answer file provides answers to some or all of the prompts you normally respond to during Setup.
- /UDF:id[,UDF_file] -- Indicates an identifier (id) that Setup uses to specify how a uniqueness database file (UDF) modifies an answer file (see /u). The /udf parameter overrides values in the answer file, and the identifier determines which values in the UDF file are used. If no UDF_file is specified, Setup prompts you to insert a disk that contains the \$Unique\$.udb file.
- /R[:folder] -- Specifies an optional folder to be installed. The folder remains after Setup finishes.
- /Rx[:folder] -- Specifies an optional folder to be copied. The folder is deleted after Setup finishes.
- /E -- Specifies a command to be run at the end of the GUI-mode portion of Setup.
- /A -- Enables accessibility options.

So, for example, if you want Setup to place temporary files on a particular drive, and then install Windows 2000 on that drive with accessibility options, you'd type the following from the command line:

```
WINNT /T[:tempdrive] /A
```


Winnt32 is the 32-bit setup tool designed to be launched from 32-bit operating systems such as Windows 95, 98, and NT. Winnt32 is designed for standard and automated installations, and it also offers several options for source and destination locations as well as debug logging. The command-line syntax for the Winnt32 command is as follows:



This material is taken from the online Help information on the installation CD in the /i386 directory, obtained by entering the “winnt32 /?” command at the command prompt.

```
winnt32 [/s:sourcepath] [/tempdrive:drive_letter]
[/unattend[num]:[answer_file]] [/copydir:folder_name]
[/copysource:folder_name] [/cmd:command_line] [/debug[level]:[file-
name]] [/udf:id[,UDF_file]] [/syspart:drive_letter] [/checkup-
gradeonly] [/cmdcons] [/m:folder_name] [/makelocalsource]
[/noreboot]
```

- /s:sourcepath -- Specifies the source location of the Windows2000 files. To simultaneously copy files from multiple servers, specify multiple /s sources. If you use multiple /s switches, the first specified server must be available or Setup will fail.
- /tempdrive:drive_letter -- Directs Setup to place temporary files on the specified partition and to install Windows2000 on that partition.
- /unattend -- Upgrades your previous version of Windows2000, WindowsNT3.51–4.0, Windows98, or Windows95 in unattended Setup mode. All user settings are taken from the previous installation, so no user intervention is required during Setup.
- Using the /unattend switch to automate Setup affirms that you have read and accepted the End User License Agreement (EULA) for Windows2000. Before using this switch to install Windows2000 on behalf of an organization other than your own, you must confirm that the end user (whether an individual, or a single entity) has received, read and accepted the terms of the Windows2000 EULA. OEMs may not specify this key on machines being sold to end users.
- /unattend[num]:[answer_file] -- Performs a fresh installation in unattended Setup mode. The answer file provides Setup with your custom specifications.
- Num is the number of seconds between the time that Setup finishes copying the files and when it restarts your computer. You can use num on any computer running WindowsNT or Windows2000.
- Answer_file is the name of the answer file.
- /copydir:folder_name -- Creates an additional folder within the folder in which the Windows2000 files are installed. For example, if the source folder contains a folder called Private_drivers that has modifications just for your site, you can type /copydir:Private_drivers to have Setup copy that folder to your installed Windows2000 folder. So then the new folder location would be C:\Winnt\Private_drivers. You can use /copydir to create as many additional folders as you want.

- `/copysource:folder_name` -- Creates a temporary additional folder within the folder in which the Windows2000 files are installed. For example, if the source folder contains a folder called `Private_drivers` that has modifications just for your site, you can type `/copysource:Private_drivers` to have Setup copy that folder to your installed Windows2000 folder and use its files during Setup. So then the temporary folder location would be `C:\Winnt\Private_drivers`. Unlike the folders `/copydir` creates, `/copysource` folders are deleted after Setup completes.
- `/cmd:command_line` -- Instructs Setup to carry out a specific command before the final phase of Setup. This would occur after your computer has restarted twice and after Setup has collected the necessary configuration information, but before Setup is complete.
- `/debug[level]:[filename]` -- Creates a debug log at the level specified, for example, `/debug4:C:\Win2000.log`. The default log file is `C:\%Windir%\Winnt32.log`, with the debug level set to 2. The log levels are as follows: 0-severe errors, 1-errors, 2-warnings, 3-information, and 4-detailed information for debugging. Each level includes the levels below it.
- `/udf:id[,UDB_file]` -- Indicates an identifier (id) that Setup uses to specify how a Uniqueness Database (UDB) file modifies an answer file (see the `/unattend` entry). The UDB overrides values in the answer file, and the identifier determines which values in the UDB file are used. For example, `/udf:RAS_user,Our_company.udb` overrides settings specified for the identifier `RAS_user` in the `Our_company.udb` file. If no `UDB_file` is specified, Setup prompts the user to insert a disk that contains the `$Unique$.udb` file.
- `/syspart:drive_letter` -- Specifies that you can copy Setup startup files to a hard disk, mark the disk as active, and then install the disk into another computer. When you start that computer, it automatically starts with the next phase of the Setup. You must always use the `/tempdrive` parameter with the `/syspart` parameter.
- The `/syspart` switch for `Winnt32.exe` only runs from a computer that already has WindowsNT3.51, WindowsNT4.0, or Windows2000 installed on it. It cannot be run from Windows9x.
- `/checkupgradeonly` -- Checks your computer for upgrade compatibility with Windows2000. For Windows95 or Windows98 upgrades, Setup creates a report named `Upgrade.txt` in the Windows installation folder. For WindowsNT 3.51 or 4.0 upgrades, it saves the report to the `Winnt32.log` in the installation folder.
- `/cmdcons` -- Adds to the operating system selection screen a Recovery Console option for repairing a failed installation. It is only used post-Setup.
- `/m:folder_name` -- Specifies that Setup copies replacement files from an alternate location. Instructs Setup to look in the alternate location first and if files are present, use them instead of the files from the default location.
- `/makelocalsource` -- Instructs Setup to copy all installation source files to your local hard disk. Use `/makelocalsource` when installing from a CD to provide installation files when the CD is not available later in the installation.

```
• /noreboot -- Instructs Setup to not restart the computer after  
the file copy phase of winnt32 is completed so that you can execute  
another command.
```

Advanced Setup Options

Windows 2000 Professional offers several advanced setup options. These options are often used in enterprise network deployments. They require significant preparation work and preconfiguration of systems and setup scripts.

The first advanced option is that of Sysprep. **Sysprep** is a tool used to duplicate an entire hard drive. This tool is useful for installing Windows 2000 onto multiple identical systems that require identical configurations. Basically, you install Windows 2000 onto a single computer and add all applications and make all configuration changes. This system is the master that is duplicated to the other systems. For details on using Sysprep, see the Windows 2000 Support Tools.

Another advanced option is the **Remote Installation Service (RIS)** found on Windows 2000 Server. This service is used to “push” installation of Windows 2000 (Professional or Server) over a network to a client. RIS can install Windows 2000 onto a new client with only a Dynamic Host Configuration Protocol (DHCP) PXE (preboot execution environment)-based remote boot ROM, or an RIS boot disk supported **network adapter**, or a client with an existing OS. In either case, you can completely preconfigure the installation of Windows 2000 so that the only action you need to perform on the client is to power it on.

Microsoft has also added the **Windows Installer Service (WIS)** to Windows 2000 to simplify the deployment of multiple applications onto new clients. Microsoft also plans to offer WIS for Windows 95, 98, and NT. WIS combines the setup procedures for multiple applications into a single administrative action. WIS also centralizes application installations and simplifies the daunting task of maintaining updated software throughout a network.

WINDOWS 2000 PROFESSIONAL SETUP: STEP BY STEP

Installing Windows 2000 Professional is not difficult. In fact, it is a little easier than the process for Windows NT, but not quite as simple as that for Windows 98. In any case, you should be able to perform a typical installation without a hitch. Before we jump into the step-by-step process, we need to detail a few assumptions:

- Your computer’s hardware is HCL-compliant, and all required device drivers are found on the distribution CD.
- Your computer does not have any preexisting operating systems installed.
- You have the four setup floppies available.
- You will select the default or typical settings for this installation.
- You will be using a specific IP address. Thus, you need the IP address, subnet mask, and default gateway on hand. If you don’t know these yet, you can use 172.16.1.1

for the IP address and 255.255.0.0 for the subnet mask, as working placeholders. You don't need a placeholder for the default gateway.

- You will be a member of an existing domain. You'll need to have the name of this domain and the authentication information for an **Administrator** account (the Administrator account can perform a full array of management functions). If a domain is not available, you can choose to join a workgroup and assign it any name you want.

Text-only Portion of Setup

The first portion of the setup process when you employ a DOS setup method (see the discussion earlier in this chapter) is a text-only interface. This section walks you through every prompt of this portion of Setup.

1. Insert the first Setup boot disk into the floppy drive.
2. Turn on the computer.
3. After the computer starts to boot from the floppy (when the computer begins accessing the floppy drive), place the Windows 2000 Professional CD-ROM into your CD-ROM drive.
4. After data is copied from the first disk, you'll be prompted to insert Disk #2. Remove Disk #1, insert Disk #2, then press Enter. Repeat this for Disks #3 and #4.
5. Next, the setup routine prompt asks whether you wish to set up, repair, or quit:

Welcome to Setup.

This portion of the Setup program prepares Microsoft (R) Windows 2000 (TM) to run on your computer.

* To set up Windows 2000 now, press ENTER.

* To repair a Windows 2000 installation, press R.

* To quit Setup without installing Windows 2000, press F3.

Press Enter to continue with the installation.

6. Setup then inspects your hard drives; this should take only a few seconds.
7. Next, you'll be presented with the license agreement. Using the Page Down key, scroll through this document. Once you've read it, press F8 to continue with the installation. If you cannot agree to the terms of the agreement, you should press Esc to end Setup.
8. Next, Setup searches for preexisting operating systems on your computer. If any are found, you'll be prompted to indicate whether to perform a repair or to continue with a clean installation. Because we are assuming you are installing on a new system, if you see this prompt, press Esc to continue with a clean installation.
9. Next, you are prompted for the destination drive and partition where Windows 2000 Professional will be installed. Using the arrow keys, you can select either a preexisting partition or an area of unpartitioned space. Because we assume

you are installing onto a new computer, there should be only unpartitioned space. Select the unpartitioned space on the first (or only) hard drive, then press Enter.



If you do not wish to make the largest partition possible (for storage reasons), then you can manually create a partition, using the C command. First, select an unpartitioned space, then press C. Then, you'll be prompted for the size of the partition to create (or whether to use the entire drive). Once it is created, you'll be able to select the newly created partition now listed on the original drive and partition list. If you need to delete an existing partition, you can do so by selecting it, then pressing D. You'll need to confirm this process, so be sure to read the next screen and follow its instructions. Once the partition is deleted, the list of drives and partitions will be updated. Be careful when using this interface, because changes are made immediately to the drive's configuration.

10. Next, Setup prompts for the type of file system to use to format the selected destination partition. NTFS is the default selection. We recommend sticking with the default and pressing Enter.

The list of options includes only FAT and NTFS. NTFS is the recommended file system for Windows 2000. NTFS supports volumes (that is, partitions) up to 16 petabytes, although 2 Terabytes is the Microsoft specified practical limit. FAT can support partitions up to 4 GB. If a partition larger than 2 GB (even though its maximum volume size is 4 GB) is used and FAT is selected, Setup will automatically format the partition with FAT32. FAT32 has the same features as FAT, with the exception of supporting volumes up to 32 GB (its maximum file size is still 4 GB).

11. Next, Setup formats your selected partition. This can take considerable time for larger partitions. Once the format is completed, Setup inspects your hard drive(s), builds a file list, then starts copying files from the CD. This process can take even longer than the formatting.
12. Eventually, the copy process finishes, and the following message will be displayed:

```
The MS-DOS based portion of Setup is complete.  
Setup will now restart your computer. After your computer  
restarts, Windows 2000 Setup will continue.  
If there is a floppy disk in Drive A:, remove it now.  
Press ENTER to restart your computer and continue  
Windows 2000 Setup.
```

Remove Disk #4 from the floppy drive, then press Enter. After the reboot, Setup enters into the GUI portion of the Windows 2000 Professional Setup process. If your computer supports booting from a CD-ROM drive, you must remove the Windows 2000 CD before rebooting.

GUI Portion of Setup

The second part of the installation takes place in GUI mode. This mode takes place in a pseudo-Windows 2000 environment where you provide configuration details.

13. The first screen of the GUI portion of Setup is just a welcome screen. Click Next to continue.



While working through the GUI portion of Setup, use caution when clicking the Next button. Often, the system takes several seconds or even a minute to alter the display, even after you've successfully clicked the Next button. You should click the Next button only once, then wait until the system responds, or at least 5 minutes, before clicking again. Otherwise, you may inadvertently skip a page of the wizard, and in some cases, you'll be unable to use the Back button to access them. If you suspect that you have skipped a wizard page, you can reboot your computer to start the GUI portion of Setup over again.

14. Setup searches for hardware components and attempts to identify Plug and Play components. This may take several minutes. Eventually, you'll be prompted to set your regional and keyboard settings. If you live in the United States, the defaults are correct. Click Next to continue.
15. Next, you are prompted for your name and an organization name. Type these in their respective fields. You can leave the organization field blank. Click Next to continue.
16. Next, you are prompted for a computer name and the password for the Administrator user account. Provide these in their respective fields, then click Next.
17. If a modem is present in your computer and it is properly detected by Setup, you'll be prompted for your area code. Provide this and click Next.
18. Next, Setup prompts you to set and confirm the time, date, and time zone. Set these, then click Next.
19. Setup loads drivers for the networking components it has detected. You'll be prompted to either accept these default settings or change them. If you are using DHCP (a method of automatically assigning IP addresses to client computers), then accepting the typical settings will be sufficient. If you need to specify an IP address, then you must select the custom settings. We assume you are using an assigned IP address, so select Custom Settings, and then click Next.
20. Setup displays the name of the detected NIC near the top of the dialog box. Three network services are listed in a center field: Client for Microsoft Networks, File and Printer Sharing for Microsoft Networks, and Internet Protocol (TCP/IP). You only need to make changes to the protocol, so select TCP/IP and click Properties. This opens the Internet Protocol (TCP/IP) Properties dialog box. Select the "Use the following IP address" radio button, then fill in the fields for IP address (either the one you are assigned or the placeholder 172.16.1.1), subnet mask (either the one you are assigned or the placeholder 255.255.0.0), and default gateway (either the one you are assigned or leave this blank). Click OK when finished. Then click Next to complete the Custom Settings for Networking.

21. Next, you are prompted for the name of the workgroup or domain of which this system will be a member. Select the workgroup or domain name radio button, then provide the appropriate name in the text field. Click Next to continue.
22. If you selected the option to join a domain, you'll be prompted for the name and password of the Administrator account in that domain. This will be used to create a computer account in the domain for your new Windows 2000 Professional system. Provide these details, then click OK.
23. Setup installs and configures numerous core system components, then adjusts the user environment, Start menu, administrative tools, and the Registry. This can take several minutes. Eventually, Setup will indicate that it is complete. Click Finish to reboot the system and boot into Windows 2000 Professional for the first time.
24. Once the system boots, you may see the Network Identification Wizard. If so, Click Next, select "Do not add users at this time," click Next, then click Finish.
25. The logon splash screen is displayed. Press Ctrl+Alt+Delete.
26. Type the password for the Administrator account. Click OK to log on.
27. After several minutes of processing and establishing user profile defaults, the desktop will be displayed. You've successfully logged on and completed the installation of Windows 2000 Professional.

REMOVING WINDOWS 2000 PROFESSIONAL

Windows 2000 does not offer an uninstall utility. In fact, you have to be quite determined to remove Windows 2000. Windows 2000 can be removed from a system in one of two ways. One option is to destroy the partition(s) where Windows 2000 has made its mark (that is, the boot and system partitions), then repartition, format, and install another operating system. The other option is available only if you installed Windows 2000 into a FAT (not FAT32) partition. In this case, you just delete all of the Windows 2000 files and rebuild the **master boot record (MBR)**, which is the first sector on a hard disk and contains executable code and a partition table, which stores information about the disk's primary and extended partitions. The MBR is automatically rebuilt every time a system is rebooted.

Destroying Partitions

In our opinion, the easiest method of removing Windows 2000 is to destroy the Windows 2000 partition and start fresh with some other operating system. The first step to this process is to back up any data that you consider important. Removing a partition may destroy your data (especially on the boot or system partitions). The steps for the removal are as follows:

1. Back up any data or files on the Windows 2000 file system that you want to preserve.
2. Boot the computer, using the four setup boot floppies in the same manner as if you were installing Windows 2000.

3. Continue through the same setup steps described earlier in this chapter.
4. Once you reach Step 10, where you are prompted for the destination drive and partition, you'll want to use this interface to delete all partitions (or at least all NTFS partitions). Use the arrow keys to select each partition, press D to delete, then L to confirm. Once all partitions are deleted, press F3 to exit. You'll have to confirm aborting the setup process by pressing F3 again.
5. At this point, your computer's hard drive is not partitioned. Use a DOS disk or a Windows 95/98/NT installation boot disk to start the installation process for another operating system.

Removing Windows 2000 from FAT

If you installed Windows 2000 into a FAT partition less than 2 GB in size, then you may be able to remove it from your computer without performing the method described in the previous section. You still need to back up all important data. Also, this method works only if you have not used NTFS partitions at all. Otherwise, you'll have to use the destroy method to remove those partitions in addition to the FAT uninstallation.

Before you get started, you'll need to obtain a DOS boot disk with the FDISK, FORMAT, DELTREE, and SYS utilities on it. In most cases, the first disk of the MS-DOS installation disk set will suffice. For the following steps, we assume you installed Windows 2000 into the default directory \Winnt on drive C. If not, you'll need to replace the path details with yours in the following process. The process for removing Windows 2000 from a FAT partition is as follows:

1. The simplest method is to create a batch file to perform all of the file and directory deletions for you. Open a text editor and enter the following:

```
@echo off
a:
SYS C:
DELTREE /Y C:\WINNT
DELTREE /Y C:\PROGRA~1\WINDOW~1
DEL C:\PAGEFILE.SYS
A:\ATTRIB -S -H -R C:\BOOT.INI
DEL C:\BOOT.INI
A:\ATTRIB -S -H -R C:\NTDETECT.COM
DEL C:\NTDETECT.COM
A:\ATTRIB -S -H -R C:\NTLDR.
DEL NTLDR.
A:\ATTRIB -S -H -R C:\BOOTSECT.DOS
DEL C:\BOOTSECT.DOS
```

2. Save the batch file to a boot floppy or just to drive C, and then give it a name such as "Delw2k.bat".
3. Boot to DOS using your boot disk.
4. Execute the Delw2k.bat file.
5. Remove the DOS boot disk and reboot.

Your system should boot to DOS or to your previous operating system. Although this method does function, we still think that destroying partitions and starting over is a better solution.

CHAPTER SUMMARY

- This chapter taught you how to install and uninstall Windows 2000 Professional, including the tools and information you need to make this possible. At this point, you should understand how to choose hardware for a successful installation, how to install Windows 2000 both locally and across the network, how to use the switches that come with Winnt and Winnt32, and how to run Setup.
- In addition, this chapter discussed the items you must understand to decide whether to perform an upgrade or a fresh installation of Windows 2000 Professional, as well as provided an understanding of booting multiple operating systems with Windows 2000.
- This chapter also examined the main points involved in planning an installation of Windows 2000 or an upgrade from an existing version of Windows.
- Windows 2000 has a number of setup and advanced installation options, including using disks, the CD-ROM, or the network for installation.
- Finally, this chapter explored the steps necessary for an unattended installation of Windows 2000, using an answer file and a uniqueness database file (UDF) to deploy installations of Windows 2000 Professional across the network without requiring human intervention.

KEY TERMS

active partition — The partition that the computer uses to boot.

Administrator — The Windows 2000 account designed to perform a full array of management functions.

answer file — A text file that contains a complete set of instructions for installing Windows 2000.

boot loader — The software that shows all operating systems currently available and, via a menu, permits the user to choose which one should be booted.

Boot.ini — The text file that creates the Windows 2000 boot loader's menu.

clean installation — See fresh installation.

dual-boot system — A multiboot system with only two operating systems.

FDISK — A DOS utility used to partition a hard disk. The DOS FDISK tool can only see and manipulate primary NTFS partitions; it cannot even view logical drives in an extended partition formatted with NTFS.

file system — The method used to arrange files on disk and read and write them. Windows 2000 supports NTFS, FAT, and FAT32 disk file systems.

format — Rewriting the track and sector information on a disk. This process removes all data previously on the disk.

fresh installation — The installation method in which an operating system is installed without regard to preexisting operating systems. In other words, all settings and configurations are set to the OS's defaults.

master boot record (MBR) — The first sector on a hard disk, which contains executable code and a partition table, which stores information about the disk's primary and extended partitions.

multiboot system — A computer that hosts two or more operating systems that can be booted by selecting one from a boot menu or boot manager during each power on.

network adapter — Another name for network interface card (NIC), the piece of hardware that enables communication between the computer and the network.

partition — A space set aside on a disk and assigned a drive letter. A partition may take up all or part of the space on a disk. You create partitions when installing an operating system or when adding new drives.

Remote Installation Service (RIS) — A service used to “push” an installation of Windows 2000 (Professional or Server) over a network to a client.

setup boot disks (or floppies) — The four disks used by Windows 2000 to initiate the installation process on computer systems that do not have an existing OS, do not have a CD-ROM that supports bootable CDs, or that do not have network access to a Windows 2000 distribution file share. These disks can be created by running the Makeboot file from the Bootdisk directory on the distribution CD.

Setup Manager — The Windows 2000 tool that provides you with a GUI interface for creating an answer file.

Sysdiff — The Windows 2000 utility used to take a snapshot of a basic installation and, after changes have been made, record the changes and then apply them to another installation.

System Preparation tool (Sysprep) — A tool used to duplicate an entire hard drive. This tool is useful when installing Windows 2000 onto multiple identical systems that require identical configurations.

unattended installation — A Windows 2000 installation that uses a previously made script to install from. Such an installation method does not require user interaction.

uniqueness database file (UDF) — A text file that contains a partial set of instructions for installing Windows 2000, to specify settings for individual users. Used to supplement an answer file, when only minor changes are needed that don't require a new answer file.

upgrade installation — The installation method in which data and configuration settings from the previous operating systems remain intact. The level or amount of retained data varies according to the existing operating system's type.

Windows Installer Service (WIS) — A component of Windows 2000 that manages the installation and removal of applications by applying a set of centrally defined setup rules during the installation process.

Winnt — The 16-bit Windows 2000 installation program.

Winnt32 — The 32-bit Windows 2000 installation program.

x86 — The chip architecture used by Intel and others to create 386 and later CPUs (including the Pentium).

REVIEW QUESTIONS

1. Which operating systems other than Windows 2000 can be installed onto a computer system in a multiboot configuration without requiring special third-party software? (Choose all that apply.)
 - a. DOS
 - b. OS/2
 - c. Linux
 - d. Windows 95
2. Microsoft will provide support only for problems caused by hardware not on the hardware compatibility list. True or False?
3. Which of the following operating systems may be upgraded to Windows 2000 Professional? (Choose all that apply.)
 - a. Windows 3.x
 - b. Windows for Workgroups 3.x
 - c. Windows 95/98
 - d. Windows NT 3.x+
4. Data stored on a partition formatted with FAT32 is only accessible from Windows 2000. True or False?
5. Which of the following is the correct location for the x86 installation files on the installation CD?
 - a. the root directory of the CD
 - b. \Support\i386
 - c. \Install\i86
 - d. none of the above
6. When sharing an installation folder across the network, you should assign it _____ permission.
7. Which of the following are situations that allow a floppyless installation? (Choose all that apply.)
 - a. The network is not yet functioning.
 - b. The hard disk for the computer on which Windows 2000 is being installed is not yet formatted.
 - c. No CD drivers are present for the existing operating system.
 - d. Windows 95 is already installed on the computer.
8. Windows 2000 can be installed with only the CD-ROM if the computer's hardware is properly configured. True or False?

9. What is the command used to create setup floppy disks?
 - a. Winnt32 /ox
 - b. Makeboot
 - c. Winnt32 /b
 - d. Start, Settings, System – Create Boot Disk button
10. What is the DOS utility used to create and delete partitions on a hard disk called?
11. Windows 2000 must be installed to an NTFS partition. True or False?
12. Which of the following statements is true? (Choose all that apply.)
 - a. The entries in a uniqueness database file (UDF) override those in an answer file when the two are used together.
 - b. An answer file is used to script text-mode Setup, whereas a UDF scripts GUI-mode Setup.
 - c. If you have several installations to complete that differ only in the username, then you can use an answer file to customize the settings in the UDF.
 - d. Answer files can be created using the Setup Manager.
13. The maximum volume size for FAT32 partitions is 2 TB. True or False?
14. Which file system can be used on an installation destination directory for Windows 2000 Professional if the partition is 4 GB in size? (Choose all that apply.)
 - a. FAT
 - b. FAT32
 - c. NTFS
15. When removing Windows 2000, all NTFS partitions can be deleted with just FDISK. True or False?
16. Which of the following commands is used to record the original state of a Windows 2000 installation?
 - a. Sysdiff /apply
 - b. Sysdiff /diff
 - c. Sysdiff /inf
 - d. Sysdiff /snap
17. Running _____ creates a text record of a Sysdiff difference file.
18. Which command would you use to map a network drive from a DOS computer?
 - a. NET START
 - b. NET LOGON
 - c. NET USE
 - d. NET CONNECT

19. The _____ Winnt switch is used to specify a setup information file other than Dosnet.inf.
20. At what point in the installation do you have the option of converting the file system to NTFS?
 - a. after selecting the installation partition
 - b. after the hard disk has been examined
 - c. at the end of the GUI-mode portion of installation
 - d. You must convert the partition after Setup has been completed.
21. The Unattend.txt file included as a sample on the Windows 2000 Professional CD can be used without modification to perform an upgrade of Windows NT Workstation. True or False?
22. Unattended, or automated, installation scripts can be created to perform which of the following functions? (Choose all that apply.)
 - a. duplicate an existing system's configuration
 - b. create a read-only installation whereby viewers can step through the installation but not make any configuration changes
 - c. automate only the GUI portion of Setup
 - d. provide custom defaults but allow installer to change settings
23. What is the one action you must perform no matter from which operating system you launch a network installation of Windows 2000?
 - a. install TCP/IP
 - b. map a network drive to the Windows 2000 share
 - c. preformat a 4 GB partition with FAT32
 - d. use SYS C: to repair the MBR
24. You're preparing for a network installation of Windows 2000. Which of the following is not a step required to accomplish this? (Choose all that apply.)
 - a. Copy the \Support directory from the installation CD to the server supplying the installation files.
 - b. Share the installation directory with Read permissions.
 - c. Boot the destination client computer onto the network.
 - d. Run Winnt32 /n on the network server.
25. You want to change the menu description for Windows 2000 in the boot loader's menu. Which file will you edit to make the change?
 - a. Dosnet.inf
 - b. Unattend.txt
 - c. Boot.ini
 - d. Winnt.ini

HANDS-ON PROJECTS



Project 2-1

To make the Windows 2000 Professional x86 installation files available for network installations from a Windows 2000 Server computer:

1. Using an Administrator account, log on to the Windows 2000 Server computer that will be sharing the files.
2. Insert the Windows 2000 Professional installation CD-ROM into the CD-ROM drive on the server. The autorun mechanism should open the CD splash screen (see Figure 2-4). Click **Exit** to close the splash screen.



If a screen appears asking if you would like to upgrade to Windows 2000, click No and then click Exit to close the splash screen.

3. Launch Windows Explorer (**Start, Programs, Accessories, Windows Explorer**).
4. Select the CD-ROM drive icon in the left pane.
5. Locate the \i386 directory in the right pane. Drag and drop the **i386** directory to the C: drive icon in the left pane (or another hard drive with at least 300 MB of free space).
6. This copies the entire directory to your hard drive. Once the copy process is complete, select the **i386** folder on the hard drive and right-click, then select **Sharing** from the resulting menu.

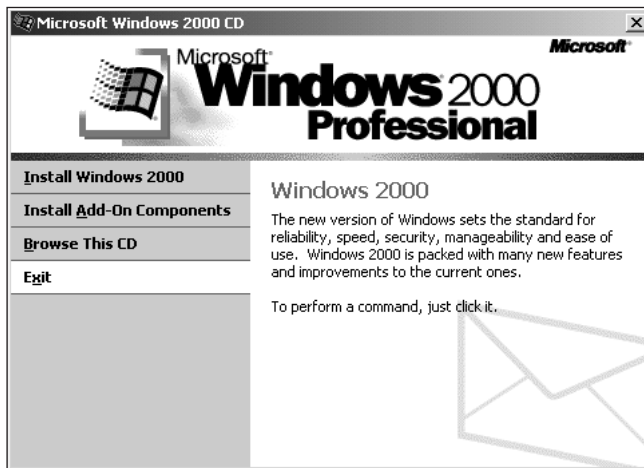


Figure 2-4 The Windows 2000 Professional CD splash screen

7. Select the **Share this folder** radio button. Provide a share name, such as **W2KPRO**.

8. Click **Permissions**, click **Add**. Locate and select the **Everyone** group if necessary, click **Add**, then click **OK**.
9. While the Everyone group is highlighted in the Permissions dialog box, set the access permissions to **Allow Read** (see Figure 2-5). Click **OK** to close the Permissions dialog box. Click **OK** to close the Sharing dialog box. Click **OK** to close the i386 Properties dialog box.

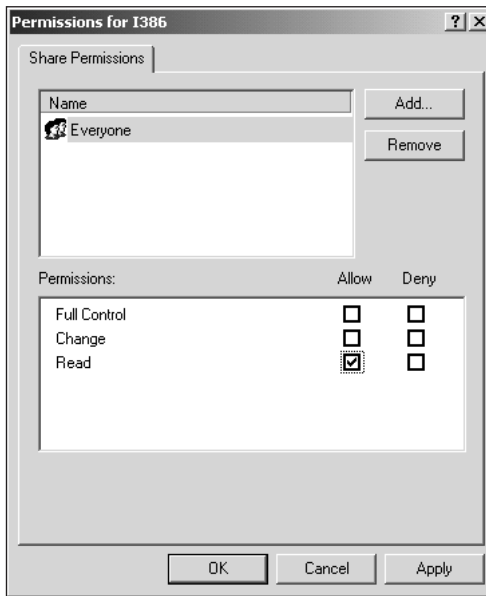


Figure 2-5 Setting permissions for the Everyone group



Project 2-2

To create the four setup boot disks for Windows 2000 Professional:

1. Collect four blank, formatted, high-density floppy disks.
2. Place the Windows 2000 Professional CD into the CD-ROM drive. When the Microsoft Windows 2000 splash screen appears, click **Exit** to close the splash screen.
3. Open the Run command (**Start, Run**).
4. Type **<CD-ROM drive>:\bootdisk\makeboot**, where **<CD-ROM drive>** is the letter of your CD-ROM drive, then click **OK**.
5. Place the first floppy in the disk drive. Press **A** to indicate the floppy drive letter.
6. Press any key to start the creation process.
7. Once the first disk copy is complete, remove Disk #1, insert Disk #2, and then press any key to copy the next disk.
8. Repeat this process for the remaining disks.



Project 2-3

To use the FDISK utility to partition the hard disk into two partitions:



Back up any data currently on the disk before repartitioning it! FDISK (or any partitioning utility) will permanently destroy any data currently on the hard disk.

1. Boot the computer to DOS by selecting DOS from the boot menu or using a DOS boot disk.
2. Move to the directory containing the FDISK utility. (To find it, type **DIR FDISK.* /s** to search all subdirectories on the current disk.)
3. Type **FDISK** and press **Enter** to start the utility. When FDISK starts, you will see a menu of four options:
 - 1 Create DOS partition or Logical DOS drive
 - 2 Set active partition
 - 3 Delete DOS partition or Logical DOS drive
 - 4 Display partition information



If your computer has more than one hard disk, you'll see a fifth option: "Change current fixed drive."

4. Type **4** and then press **Enter** to view the partitions currently on the hard disk. In this example, it is assumed that you'll see a single primary DOS partition. After reviewing the information, press **Esc** to return to the main menu.
5. Once at the main menu screen, type **3** and press **Enter** to delete the primary partition. When asked which partition to delete, type **1** and press **Enter**.
6. When prompted, type the volume label (if any) for the partition you're deleting. The label will be listed at the top of the screen with other volume information. If there is no volume label, just press **Enter**.
7. Type **Y** and press **Enter** to confirm the deletion of the selected partition.
8. Press **Esc** to return to the main menu.
9. From the main menu, type **1** and press **Enter** to create a DOS partition.
10. Type **N** and press **Enter** when asked whether you want to use the maximum available space. When prompted, type in the size (in megabytes) of the partition you want to create. For installing Windows 2000, a drive size of about 2 GB is recommended.
11. From the main menu, type **2** and press **Enter** to set the active partition. When prompted, type **1** to choose the partition you just created.

12. Press **Esc** to return to the main menu, then press **Esc** again to exit FDISK.
13. Reboot the computer. You'll need to install an operating system (such as Windows 2000) to format the partition.



It's unnecessary to partition the remaining space on the drive now, because you can do that while installing Windows 2000.



Project 2-4

To install the Windows 2000 Support Tools:



You must be logged in with Administrator privileges to complete this project.

1. Insert the Windows 2000 Professional CD into the CD-ROM drive. The Windows 2000 splash screen appears. Click **Exit** to close the splash screen.
2. Open the Run dialog box (**Start, Run**).
3. Click the **Browse** button.
4. Locate the CD-ROM drive, find the \Support directory, select **Setup.exe**, and click **Open**.
5. Click **OK** to execute the installation.
6. The Windows 2000 Professional Support Tools installation wizard appears. Click **Next**.
7. Provide your name and organization name (if applicable), and click **Next**.
8. Select the **Typical** installation method (it's the default), and click **Next**.
9. Click **Next** again to start the installation.
10. When copying is complete, click **Finish**.



Project 2-5

To create an answer file for an unattended installation for an x86-based system, using the Setup Manager Wizard from the Windows 2000 Support Tools:



You must be logged in with Administrator privileges to complete this project.

1. Insert the Windows 2000 Professional CD-ROM into the CD-ROM drive and click **Exit** to close the splash screen.

2. Launch Windows Explorer (**Start, Programs, Accessories, Windows Explorer**) and create a new folder on your hard drive called **SetupMgr**.
3. In Windows Explorer, open the Support\Tools folder on the CD-ROM.
4. Double-click **Deploy.cab**.
5. Copy **Setupmgr.exe** and **Setupmgx.dll** to the folder you created in Step 2.
6. Open the Run command (**Start, Run**).
7. Click **Browse**.
8. Locate and select the **Setupmgr.exe** file in the folder you created in Step 2, and click **Open**.
9. Click **OK** to launch the Setup Manager wizard.
10. The Setup Manager wizard launches. Click **Next**.
11. Select the **Create a new answer file** option (the default) (see Figure 2-6), click **Next**.
12. Select the **Windows 2000 Unattended Installation** option (see Figure 2-7), click **Next**.
13. Select the **Windows 2000 Professional** option, click **Next**.
14. Select the **Fully automated** answer file type (see Figure 2-8), click **Next**.

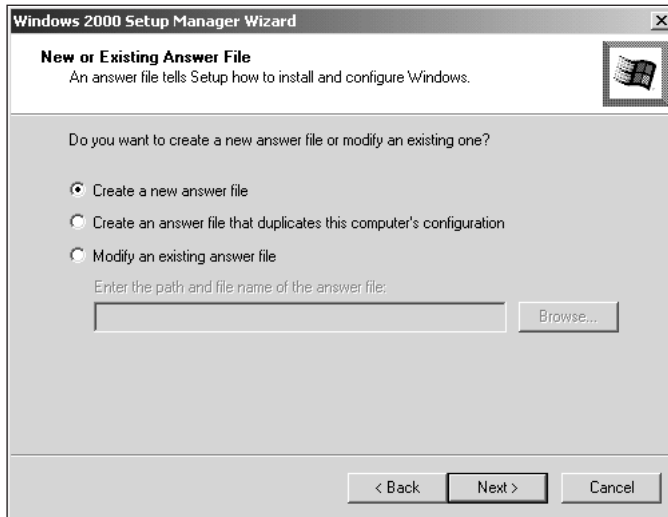


Figure 2-6 Selecting to create a new answer file

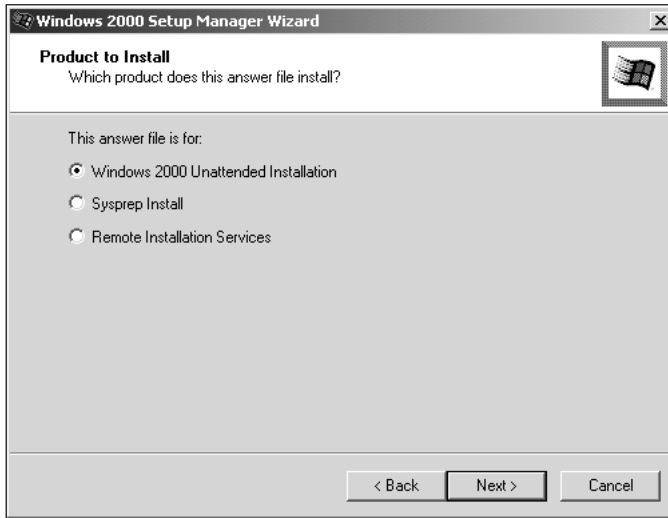


Figure 2-7 Selecting the product to install

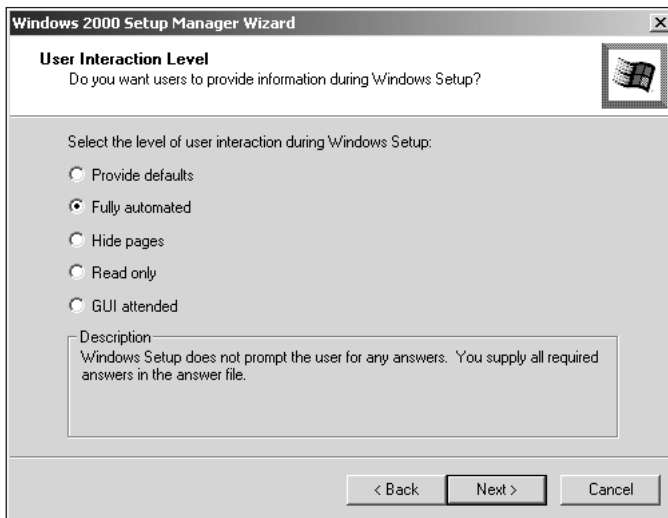


Figure 2-8 Selecting the Fully automated answer file type

15. Click the **I accept the terms of the License Agreement** check box, then click **Next**.
16. Provide a name and organization name for the answer file, then click **Next**.
17. Provide a name for the computer, click **Add**, then click **Next**.
18. Provide the password for the administrator account on this system (see Figure 2-9), then click **Next**.

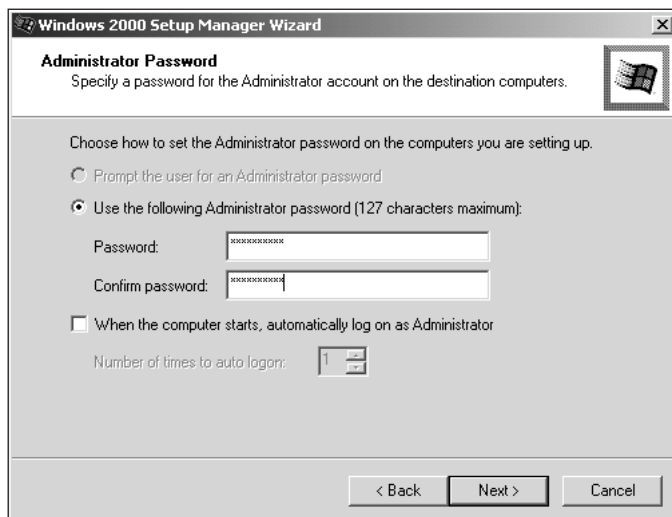


Figure 2-9 Setting the Administrator password

19. Set the **Colors**, **Screen area**, and **Refresh frequency** based on the destination system's needs. For now, just accept the default setting of **Use Windows default**. Click **Next**.
20. Next, select either typical or custom network configurations. For this project, we'll assume the destination system will use DHCP. So select **Typical settings** (see Figure 2-10) and click **Next**.



Figure 2-10 Selecting typical network settings

21. Select the **Windows Server domain** and provide the name of the domain (see Figure 2-11). Then click the **Create a computer account in the domain** checkbox and provide the name and password (with confirmation) of an administrator account in this domain. Click **Next**.
22. Set the time zone, then click **Next**.
23. Select **No, do not edit additional settings**, then click **Next**.
24. Select **No, this answer file will be used to install from a CD**, then click **Next**.
25. Provide a location and file name for the answer file. Click **Next**.
26. Click **Finish**.

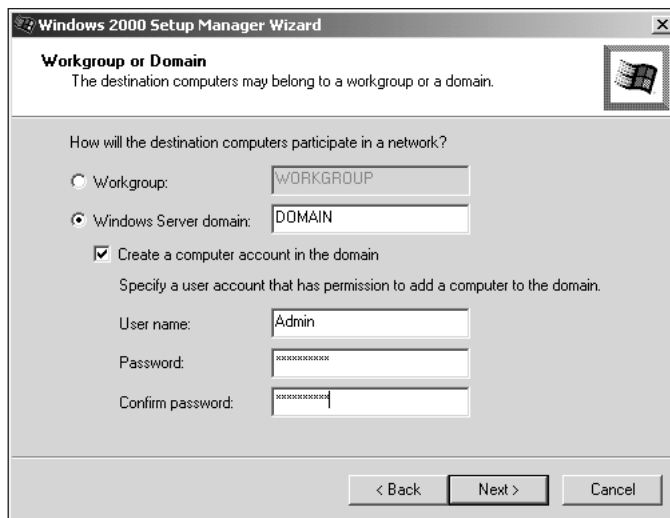


Figure 2-11 Joining a domain



Project 2-6

To upgrade to Windows 2000 Professional from Windows NT or Windows 98:

1. Place the Windows 2000 Professional CD in the cd-rom drive. The autorun mechanism should open the CD splash screen and prompt you whether to upgrade. Click **No**, then click **Exit** to close the splash screen.
2. Open the Run command by selecting **Start, Run**.
3. Click **Browse**.
4. Locate and select **Winnt32.exe** on the Windows 2000 Professional CD using the Browse dialog box.
5. Click **Open**. The path for the Winnt32 file should now appear in the Open field of the Run dialog box.

6. Click **OK**. This launches the installation wizard and you are prompted to choose an installation method.
7. Select the **Upgrade** option (refer to Figure 2-1). Click **Next**.
8. Select the I accept this agreement radio button. Click **Next**.
9. Provide your Product Key from the back of the CD case. Click **Next**. The Setup wizard will begin the upgrade process, which includes several file copies, system component detection, and reboots. This will take a few minutes.
10. Provide any information or configuration settings required by setup which cannot be obtained from or determined by the previous operating system.
11. The installation will complete and present you with a prompt to press Ctrl+Alt+Delete to log on. Press **Ctrl+Alt+Delete** to log on.

CASE PROJECTS



1. You're in charge of organizing the installation of Windows 2000 Professional onto a number of networked computers that currently host only DOS. Some of these computers will have applications in common, but not all of them, and you'll need to set usernames and computer names for each installation. You've got a lot to take care of, so you'd like the installation to go as quickly as possible. Which of the following will you use? Choose all that apply, and justify your choice(s).
 - a. An answer file
 - b. A uniqueness database file
 - c. Sysdiff
 - d. Winnt32
2. Please describe the five types of answer files that can be created by the Setup Manager tool from the Support Tools. Also, describe a scenario for each type of answer file that explains why that type is best suited for the situation.